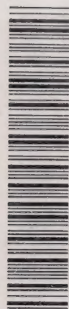


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EASTCOAST OFFSHORE OIL AND GAS DEVELOPMENT

Sonya Dakers
Science and Technology Division

Revised 5 July 1996



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EASTCOAST OFFSHORE OIL AND GAS DEVELOPMENT*

ISSUE DEFINITION

The discovery of important accumulations of oil and natural gas in the eastcoast offshore region promises major economic and strategic benefits to Canada.

Two important finds in particular, the Venture natural gas field and the Hibernia oil field, have spurred unprecedented oil and gas activity in Atlantic Canada in recent years in spite of a long-standing jurisdictional dispute between the federal government and Newfoundland. In March 1984, the legal question of ownership was decided by the Supreme Court of Canada, opening the door for exploration to proceed but without Newfoundland's agreement. After more than two years of negotiations, a federal-provincial agreement on the joint management of offshore oil and gas development, similar to that already in place with Nova Scotia, was signed in February 1985.

Exploration and development will bring benefits in terms of local employment, in the construction, supply and servicing of rigs and production platforms and in the building of oil and gas transmission systems. It will also bring with it a number of problems. One is the safety of offshore drilling activities, given the severe climatic conditions in which drill rigs operate. Another concerns the socio-economic impact of oil and gas development on the region in terms of demand for goods and services, infrastructure, and employment and training. The pace of development will be crucial in optimizing local business and employment opportunities and minimizing disruption of services.

Conflicts between the new oil and gas industry and the historically all-important fishing industry will have to be resolved as will the effects of development on marine resources.

*

The original version of this Current Issue Review was published in May 1983; the paper has been regularly updated since that time.

BACKGROUND AND ANALYSIS

A. Exploration

1. A Historical Perspective

The widely accepted theory of plate tectonics holds that the sedimentary basin off Canada's east coast was once part of Europe. Since this area apparently shares a close geological link with the North Sea, it is not unreasonable to assume that it might share some of its hydrocarbon potential as well. To date, the United Kingdom's part of the North Sea alone has revealed some 22 billion barrels of recoverable oil. It was these favourable geological prospects which prompted the start of oil and gas exploration off the east coast of Canada in 1966. While early drilling results were not spectacular, there were numerous tantalizing shows of oil and gas. The prospect of success, coupled with developments in the North Sea oil fields, encouraged the exploration companies to return year after year to continue their modest drilling programs.

The first well was drilled on the Grand Banks of Newfoundland in 1966 and a "show" of natural gas was found. The Scotian Shelf area off Nova Scotia was first explored in 1967, the Gulf of St. Lawrence in 1970, the Labrador Shelf in 1971, the East Newfoundland Shelf in 1974 and the Bay of Fundy in 1975. Although many wells showed traces of oil and/or gas, the first major gas field — the Venture field off Sable Island — was not discovered until 1979. It is now estimated that Venture contains natural gas reserves in the order of 72 billion cubic metres (approximately 2.5 trillion cubic feet). On a national scale, in a country with established natural gas reserves of 4 trillion cubic metres, this discovery may not appear especially exciting; however, its location, close to the one region of Canada still dependent on imported oil for most of its energy needs, is of particular strategic significance.

The Venture discovery was followed within months by the announcement that a significant oil field had been found on the Grand Banks, namely the Hibernia field, which was originally estimated to hold recoverable reserves of 175 million cubic metres (1.1 billion barrels). This is now reduced to a maximum of 83 million cubic metres (520 million barrels). At the time,

Hibernia represented a find of national importance, given the fact that for more than a decade established Canadian reserves of conventional crude oil had been falling.

News of Hibernia set off a round of increased exploration activity in the eastcoast offshore region. Whereas between 1966 and 1979, investment in the search for hydrocarbons off our east coast totalled about \$300 million, in 1981 alone, exploration companies spent \$442 million. Coincident with the Petroleum Incentive Program (PIP), put in place in 1982 and phased out beginning in March 1986, companies spent \$4.5 billion on exploration within this region. While only eight or nine wells were completed each year between 1978 and 1982, 21 were completed in 1983 and 23 in 1984 when rig activity was at its peak. By November 1986, the pace of activity slackened so that by the 1989 season only two wells were completed, both located in the Newfoundland offshore. One resulted in a new discovery of natural gas and oil. Canada Oil and Gas Lands Administration reported that as of 1989, best current estimates of eastcoast offshore discovered resources were 258.9 million cubic metres (1.6 billion barrels) of oil and condensate and 313.4 billion cubic metres (11 trillion cubic feet) of natural gas. This was after 24 years of drilling and 43 significant hydrocarbon discoveries. One well was drilled in 1990. Activity rose in 1991 with seven exploratory wells, five of them off Newfoundland. The first production wells were also drilled; five were drilled off Nova Scotia in that year. There was no drilling activity off Newfoundland in 1992 or 1993. Off Nova Scotia, three production wells were drilled in 1992 and seven in 1993. After a drought in drilling activity of about three years, several companies announced plans to drill exploratory wells in 1996 and 1997.

2. Environmental Impact

Although potential environmental problems are of concern anywhere oil and gas development occurs, the world's best fishing grounds, the Grand Banks, the Scotian Shelf and the northern waters off Labrador are especially vulnerable. The Hibernia region is also an important fish spawning ground and fish larvae are known to be very susceptible to even slight traces of pollution.

During the exploration phase, drilling fluids, drill cuttings and water associated with oil and gas deposits are released into the sea. Some of the additives contained in drilling fluids are toxic to marine organisms. Control must be exercised over the quantities and types of wastes released by exploration operations if the fishery is to be preserved.

A second major environmental concern is the possibility of a well blowout. The potential for serious environmental impact is reinforced by the severe winter weather conditions and the presence in some areas of an impenetrable cover of pack ice. Such conditions could delay efforts to cap a well, thereby increasing the magnitude of environmental damage. In fact, two blowouts occurred in the area in 1984 — in two gas wells being drilled in the Venture field off Sable Island. The first well was brought under control 10 days after the initial incident in March 1984, while the second, which occurred in September 1984, was only permanently capped and abandoned in July 1985. As predicted, weather conditions hampered attempts to assess and to rectify the situation. It was fortunate that low sulphur gas, rather than crude oil, was flowing uncontrollably from the wells.

Environmental pollution of quite a different nature has presented a problem in the North Sea and could occur here. Supply vessels and service boats have been known to dump large chunks of unwanted machinery overboard as they travel to and from rigs. This debris, lying on the bottom, can damage fish nets dragged along the sea floor. In one instance it cost the oil companies \$60 million to clean up a section of the North Sea fishing grounds which had been littered with such garbage.

These environmental concerns are not restricted to the exploration phase; they could be compounded during the development and production phases. Strictly enforced regulations and constant vigilance will be necessary if environmental damage is to be minimized.

3. Icebergs, Storms and Safety

Photographs taken with sophisticated sonar "cameras" show deep trenches and furrows crisscrossing the seabed off Canada's east coast. Trenches up to fifteen metres deep, two hundred metres across and three kilometres long bear mute testimony to the passage of massive

icebergs. These icebergs, which can weigh up to 50 million tonnes and tower like skyscrapers above the water, are one of the most serious threats to offshore activities. The presence of icebergs and "bergy bits" (smaller chunks of ice which have broken away from the main iceberg), and fierce Atlantic storms, featuring high winds, freezing spray, snow and low visibility, testify to the extreme conditions under which exploration is taking place.

February is a particularly bad month for drilling and there is some debate as to whether winter operations should be allowed at all. The winter of 1982-83, for example, was exceptionally severe. The International Ice Patrol reported 120 iceberg sightings south of 48°N in February 1983. The average, since 1900, is nine for this month. One method used to remove the threat which bergs pose to drill rigs is to tow them away from the general area of the rig. This becomes impossible, however, when the presence of an iceberg near a rig coincides with high winds and rough seas. Such a combination of conditions is not unusual and, in fact, occurred in February 1983 when the West Venture rig drilling in the Hibernia field found itself with about ten icebergs and many bergy bits in the vicinity. Regulations call for the rig to cease drilling, secure the drill hole and move out of the area if bergs come within a red alert zone. The West Venture attempted to do this but, because of rough seas, the ten anchors which keep it in place over the drill site could not be pulled. None of the 84 people on board could be evacuated by helicopter or by service vessel, due to the weather conditions. Fortunately for all concerned, the storm passed, the icebergs could be towed away and people could be evacuated by helicopter if necessary. This episode indicates the hazards of operating in the offshore. In fact, the Newfoundland government ordered rigs to return to port again in February 1984, because of potential ice-related problems. The federal government ordered the same rigs to keep drilling or lose their PIP grants. Until 20 February 1984, drill operators complied with the federal directives; however, on that date, two of the rigs moved off-site when threatened by an ice pack of greater length than Prince Edward Island. The situation was ultimately resolved by the breakup of the ice-pack.

A new type of drill rig, which is dynamically positioned instead of anchored, was introduced in July 1983 in an effort to alleviate some of the difficulties experienced by the West Venture. The Sedco 710, a \$150 million semi-submersible rig was custom-built in Japan in a joint

venture between Petro-Canada and Sedco Inc. of Dallas. It remains positioned over the drill hole by means of powerful computer-guided thrusters. It is more mobile than the anchored rigs and so can quickly move out of the way of icebergs.

The drilling rigs are equipped with radar systems designed to locate and monitor the movement of icebergs. When weather permits, overflights are carried out on a regular basis with sightings being made visually and with radar. A high sea state decreases the effectiveness of both types of detection and in bad weather flights often have to be cancelled. A third method of iceberg detection involves vessel ice patrols. These depend on line of sight detection and are therefore influenced by visibility and sea state.

Petroleum production methods will also have to contend with iceberg scouring, all but eliminating the possibility of a pipeline on the seabed as a means of bringing the oil or gas onshore from many parts of the eastcoast offshore. The detection and avoidance of icebergs will remain an issue of importance and concern as exploration, development and production proceed.

Severe weather conditions in February 1982 combined with other factors to cause the worst disaster ever to strike the Canadian offshore oil and gas industry. On 15 February 1982, the drill rig Ocean Ranger sank 280 km southeast of St. John's, Newfoundland, in 85 metres of water. All 84 crew members were lost in this tragic accident. The meteorological records show that waves as high as 26 m (85 feet) and winds as high as 90 knots (104 mph) hammered the rig the day it went down.

A Royal Commission headed by Chief Justice T.A. Hickman of the Supreme Court of Newfoundland investigated the accident and issued its 400-page report in August 1984. It concluded that a chain of events which included a severe winter storm, design inadequacies and lack of knowledgeable human intervention caused the loss of the Ocean Ranger and its crew. The rig capsized and sank after seawater had entered the ballast control room through a porthole smashed during the violent storm; this caused the ballast control system to malfunction. The Commission concluded that, despite this occurrence, if the crew had simply shut off the electrical supply and shut the deadlights (steel shields which were to protect the portholes), the rig would have survived the storm. Instead, the crew, who did not properly understand the ballast system,

reactivated it and thereby inadvertently let more water into the port portion -- leading to the eventual capsizing of the rig and loss of the entire crew.

The Commission felt that the ballast control system was too complicated, the crew inadequately familiar with its operation and the rig insufficiently equipped with lifeboats and survival gear. In addition, testimony before the Commission revealed inadequacies in the emergency evacuation training that crew members had received.

A second 693-page report, issued in July 1985, contained 70 recommendations on methods to improve eastcoast offshore safety.

Even before the Royal Commission reports were issued, the federal and provincial regulations were changed to strengthen the safety systems on drill rigs. All rigs are now required to carry 200% lifeboat and survival suit capacity and all employees must take a Marine Emergency Duties course.

According to the federal government, in April 1986, 85% of the recommendations had been totally or partially implemented, including measures in the areas of sea state forecasts, and improved iceberg detection and prediction of ocean currents and sea ice movement. The last eight recommendations were implemented with the passage of Bill C-58, An Act to amend the Oil and Gas Production and Conservation Act, which received Royal Assent on 23 June 1992.

Despite these and other efforts to upgrade safety measures on oil drilling rigs, the fact remains that the eastcoast offshore can present a very inhospitable environment for man's activities.

4. Jurisdictional Disputes

The most contentious issue which has faced the offshore oil and gas industry in recent years has been the question of who owns the offshore resources -- the federal or provincial government. While the question of jurisdiction varies from province to province, nowhere has it been more contentious than in Newfoundland.

The legal aspects of this historical federal-provincial dispute are set out in some detail in an archived Current Issue Review 80-8E, *Offshore Mineral Resources: Legal Aspects*, so

only the highlights are presented here. This is an issue which required resolution before development and production of our offshore hydrocarbon resources could go ahead. In the late 1970s, the government of Newfoundland and the federal government engaged in negotiations to establish a joint management scheme in the offshore area, which would set aside the question of ownership but still allow development to take place. Just such an approach was proposed by Prime Minister Trudeau in July 1981. Newfoundland was responding favourably to this approach when, in December 1981, the federal government passed *The Canada Oil and Gas Act*. This Act concerned oil and gas rights on "Canada Lands," the definition of which includes the disputed eastcoast offshore area. Newfoundland was very bitter about this action by the federal government and referred the question of offshore resources to the Supreme Court of Newfoundland. While awaiting the ruling by the Provincial Supreme Court, further negotiations were held between the two levels of government, with little progress being made. Finally, in May 1982, the federal government, not waiting for a ruling by the Newfoundland Supreme Court, referred the question of ownership of resources in the Hibernia area to the Supreme Court of Canada. It was argued that this action was necessary because development had already been delayed too long. No matter what the ruling of the provincial court, in the final analysis it would be the Supreme Court of Canada which would decide the issue. In February 1983 the Supreme Court of Newfoundland presented its ruling, stating that rights over offshore resources were, in its opinion, vested in the federal government. Only a week after this ruling the Supreme Court of Canada held its first hearings on the question.

It was not until 8 March 1984, however, that the Supreme Court of Canada finally made its ruling on this vital issue. The ruling was the same as that of the Provincial Supreme Court — that is, that the federal government has jurisdiction over, and therefore the right to search for and exploit, the mineral and other natural resources off the coast of Newfoundland.

Although this settled the ownership dispute and development could proceed, the parties concerned continued to try to reach agreement on management of oil and gas resources. Agreement on a draft proposal for control and revenue sharing for the Grand Banks oil fields was reached in December 1984 between the Government of Newfoundland and the new federal

government. The result was the Atlantic Accord, signed on 11 February 1985. The Accord sketched out a management framework, giving the province development control over the resources once Canadian energy self-sufficiency was reached, and a large share of the revenues. An independent management board and a development fund were also established. Legislation implementing the Accord was subsequently passed by Newfoundland in June 1986 and by Canada in March 1987.

While the rancorous debate between Newfoundland and Ottawa was going on, the federal government was working out an offshore agreement with Nova Scotia. Basically, the agreement gave Ottawa virtually complete control over the development of the resources while Nova Scotia received most of the revenues accruing from the development until its fiscal and economic capacity (decided by a complex formula) exceeded the national average by 10%. From the Venture development alone, the provincial government expected to receive \$2.4 billion. In addition, the province expected to double that figure through the involvement of the Crown corporation, Nova Scotia Resources Ltd, and other spinoff effects. The legislation putting this agreement into effect was passed in the Nova Scotia and the federal legislatures on June 30, 1984. Advance federal funding to defray infrastructure costs was approved in November 1984 for a total of \$200 million over four years.

In light of the agreement with Newfoundland, the federal government agreed to discuss adopting any of the more favourable clauses of the Atlantic Accord. Discussions resulted in a new Accord with Nova Scotia to replace the 1982 Agreement, and allow for a joint management regime. The Accord, signed on 26 August 1986, converted the \$200 million Development Fund from a loan to a grant. In addition, the Government of Canada would make available a \$25 million grant for exploration and development. Like other oil and gas producing provinces, Nova Scotia would be able to establish and collect royalties and other provincial-type resource revenues and taxes as if these taxes were on land. Nova Scotia would also receive Crown share adjustment payments. A new independent Canada-Nova Scotia Offshore Oil and Gas Board would administer and regulate all aspects of offshore oil and gas activities. Membership was to include a mutually appointed Chairman and two members appointed by each government. The Board would replace the then administrator, Canada Oil and Gas Lands Administration, when both levels of government

passed legislation to implement the Accord. Nova Scotia passed the requisite legislation in May 1987. A delay took place in the passage of the federal legislation pertaining to the Accord when the federal government responded to Nova Scotia pressure by announcing, on 18 April 1988, a drilling embargo in Georges Bank. Bill C-75, which received Royal Assent in the House of Commons on 21 July, included a provision to prevent drilling in these sensitive fishing grounds to the year 2000.

B. Development

1. The Impact of Oil and Gas Development

It is oil and gas development, not exploration, which will have the greatest impact on the economy and the social fabric of Atlantic Canada in the coming years. Exploration expenditure does affect the local economy to a great extent, but it is more likely to be seasonal and is much less "permanent" than the development and production stages. Nonetheless, many of the issues discussed in this section are applicable to the exploration phase as well.

To be very concise in quantifying the impact which oil and gas development will have on the Atlantic region, one word will suffice — massive. As exploration increases and gives rise to development and production, the local requirements for goods and services will soar. Drill rigs, drilling fluids and drill pipes; food for the rig crews; supply ships and their crews; engineering, geological and biological researchers and their ships, equipment and provision needs; warehouse facilities and port facilities; housing and schools for the families of those working the rigs and supply vessels; people and equipment to supply essential meteorological information; new sophisticated communications and data processing equipment — the list goes on and on. This tremendous need for manpower, goods and services provides an opportunity for the Atlantic provinces to turn their economies around. But if too much expansion takes place too fast, can the society cope with the changes? Can local manpower fill the requirements of the new industry and can local companies grow fast enough to meet demand? If development comes quickly and demands cannot be filled locally, the oil and gas industry will look elsewhere and the region will

lose out on these opportunities. There is also great interprovincial rivalry to capture as much of the offshore service industry as possible.

The Province of Newfoundland, for example, has a "Newfoundland first" policy whereby companies are required by law to give preference to local labour, goods and services and local supply contractors where these are competitive in terms of price, quality and deliverability. In addition, under current Newfoundland regulations, future development plans must first be approved by the energy minister and will then be thrown open to public scrutiny and debate. There is even provision for a waiting period if development appears to be moving faster than local capabilities can handle. Companies have been complying with the requirements and the participation rate for local labour has been very high in some categories, varying from 55% for seismic operations to 71% for support staff. The province has completed a study, "The Economic Impact of Future Offshore Petroleum Exploration," which identifies the areas in which the province can improve its share of the economic impact and the means by which local participation can be maximized. Two areas identified for further development are the provision of infrastructure (port facilities and air bases) and indirect services such as catering and electronic instrument servicing. The potential for market development is great, especially when one considers the prediction that it will require an expenditure of \$5.2 billion to bring Hibernia into production, about 25% of which is expected to be spent in Newfoundland. A further \$3.3 billion of capital costs are anticipated during the production phase. Operating costs during the life of the project are currently estimated at an additional \$11.5 billion.

While there is potential for economic development to be a great benefit, the possibility of concurrent social disruption is a cause for concern. The high manpower demands for service, seismic and supply vessels will attract many qualified seamen away from the traditional fishery, and the environmental concerns already noted put the oil and fishing industry at loggerheads. The influx of new people and large amounts of money seem certain to change island life dramatically -- and not necessarily for the better.

The Newfoundland Government is not alone in its desire to maximize local benefits while at the same time keeping to a minimum the negative social implications. Nova Scotia has

also studied the problem. A report entitled "Scotian Shelf Gas Development: The Economic Impact on Nova Scotia" examines the direct, indirect and induced economic impact of the gas development in the Sable Island area. The opportunities identified include module fabrication, drilling rig and supply boat repair and maintenance, and goods and services supply. Over the past few years, the province has developed a well-established petroleum services base -- giving it an advantage over Newfoundland, which is only now developing such a base. Legislation that ensures that local labour and local suppliers benefit from offshore development is in place (*Nova Scotia Petroleum Resources Act*). The presence of an existing business base could give Nova Scotia a lead in capturing the lucrative offshore business.

Nonetheless, both provinces were becoming the headquarters of a rapidly growing number of offshore service and supply companies. In 1981-82, for example, there were some 87 such companies, 22 in Nova Scotia (15 in Halifax) and 26 in Newfoundland (23 in St. John's). At the start of 1984, there were 398 such firms, with 127 in Nova Scotia (86 in Halifax) and 47 in Newfoundland (44 in St. John's). With the withdrawal of drilling activity in the fall of 1986, however, the impetus for the growth of a secondary supply and service industry was reduced.

2. Development off Nova Scotia

The signing of the management and revenue sharing agreement between Ottawa and Nova Scotia in March 1982 gave the green light to Mobil Oil of Canada to proceed with its development plans for the Venture gas field. Under the direction of federal and provincial government officials, Mobil prepared a socio-economic impact statement (SEIS). The SEIS included a great deal of information such as a project description (offshore structures, pipelines, the gas plant, etc.); the economic context of the project (regional population, labour force, employment impact); projected land requirements; housing implications; infrastructure and community service needs; and socio-cultural implications. For each of these subjects the company described the existing situation, the anticipated impacts and possible mitigative measures to minimize the project's adverse effects or enhance its positive effects.

There had been no guarantee as to when production could start, even though a significant step was taken in December 1984 with two agreements to sell Venture gas to utilities in the Northeast U.S. While the Venture discovery well showed great promise, disappointing results from delineation wells cast a different light on the project. Two further delineation wells were drilled in 1984 and early 1985 to ascertain whether the Venture field runs under the tip of Sable Island and joins the Olympia discovery on the other side.

In July of 1985, Venture partners Mobil Oil, Petro-Canada, Nova Scotia Resources and Texaco applied to the NEB to export 8.5 million cubic metres per day of natural gas to New England beginning in 1990. Nevertheless, the Venture sponsors never finalized this application nor did they supply the NEB with detailed reservoir data that would have confirmed a commercially viable project.

The project remained stalled at the regulatory stage until June 1995. In view of a projected three trillion cubic feet of recoverable gas reserves, the project's consortium launched a pre-development assessment of the Sable Island Gas Project ---an expansion of the Venture project -- prior to submitting a development application in the spring of 1996. The consortium [now Mobil Oil (41%), the operator, Shell Canada Limited (26%), Petro-Canada (18%), Imperial Oil Limited (9%), and Nova Scotia Resources Limited (6%)] proposes to produce 400 million cubic feet a day of gas over 25 years. **Production would commence by the year 2000 from 30 wells in six fields, at a cost of \$1.1 billion. The gas would be piped by marine pipeline from the six offshore platforms to a processing plant at Country Harbour in Nova Scotia. An onshore pipeline is also proposed for shipping natural gas liquids from Country Harbour to the Point Tupper area of the province. Altogether, 180 kilometres of interfield pipeline will be required. Discussions are ongoing between the federal and Quebec governments over a route for transporting the gas to the northeastern U.S. through New Brunswick and Quebec. This would involve an extension of the Trans-Quebec and Maritimes Pipeline and could generate up to 18,000 jobs. The National Energy Board had approved the TQM expansion into the Maritimes in 1981 but an expired sunset clause, which stated that the pipeline must be built before 1 December 1986, had prevented construction of the portion of the pipeline beyond Quebec City into the Maritimes.**

The application addresses the environmental and socio-economic impacts and benefits of the program as well as feasibility studies for offshore production and onshore processing and liquids handling. To avoid overlap and duplication, federal and provincial agencies are finalizing an agreement to conduct a joint federal-provincial review of the application by a joint Secretariat in Halifax. A decision on whether to proceed will not be made before mid-1997 for possible completion by November 1999.

When Texaco Canada applied to the Canada-Nova Scotia Offshore Oil and Gas Board for a \$45 million exploration agreement to sink two wells in Georges Bank sites that the firm has held since 1964, Texaco's plans ran into determined opposition from fishermen who annually harvest between \$50 million and \$80 million in scallops and groundfish from the bank's shallow waters. In December 1986, Texaco held public sessions to hear fishermen's concerns in five fishing communities in southwest Nova Scotia. A study in 1987 by the Oil and Gas Board concluded that exploration in Georges Bank would have no significant effect on the environment. Nevertheless, at the end of November 1987, the Government of Nova Scotia announced its opposition to any application by Texaco to drill there and exerted pressure upon the federal government to impose a drilling ban. This ban was announced in April 1988.

A proposal to produce 30,000 barrels a day of light crude oil by mid-1992 from two small oilfields at Cohasset and Panuke, west of Sable Island, received regulatory approval 12 September 1990. The \$565 million project would represent the first commercial oil production off the eastcoast of Canada and bring 380 jobs a year to the region during construction and another 260 during the six-year life of the project. Lasmo Nova Scotia Ltd., the operator, requires a plan to compensate area fishermen from loss due to oil activities or spills. Lasmo plans to sell its 50% interest in the project in 1996. Crown corporation Nova Scotia Resources holds the remaining 50% interest.

In July 1992, Lasmo shipped the first 500,000 barrels of light oil by tanker to Mobile, Alabama. This was the first of several cargoes delivered to North American markets, which, by the end of 1992, totalled 3.6 million barrels. Development drilling continued in 1992 (three wells) and in 1993 (seven wells) has increased reserve estimates and enhanced the

profitability of the project. Between May and December 1993, Lasmo exported over 6.3 million barrels.

3. Hibernia Development Plans

Development of the Hibernia field presents certain unique problems. For one, Hibernia is in the Grand Banks, in an environment much more hostile than the area off Sable Island. In addition, Hibernia is a deep water development (76-78 metres) compared to Venture's 22 metres. This makes the choice of production and transportation systems more difficult and, it is estimated, three times as expensive for Hibernia. Venture will involve the use of relatively simple off-the-shelf technology, while Hibernia will require development of new technologies. Even so, oil field production is slated for 1997.

In its EIS issued in May 1985, Mobil provided detailed costs on the fixed (\$4.8 billion) as opposed to the floating platform system (\$5.5 billion). Mobil maintained there would be little difference between the employment created by the two systems, which was expected to peak at 2,085 in 1989. The province supported a fixed concrete production system and Mobil was given until 15 August 1985 to announce its preferred mode of development; at that time the company agreed on the use of concrete fixed platforms.

A Federal Environmental Assessment Review Office (FEARO) Panel was named in March 1985 and held public hearings on the EIS in October. The Panel's Report was released in mid-January 1986, approving Hibernia development but at the same time setting out 50 detailed recommendations on how it should proceed.

On 24 June 1986, the Canada-Newfoundland Offshore Petroleum Board approved The Development and Benefits Plans for Hibernia. Negotiations on fiscal matters and on tax and royalty levels commenced between Mobil and its partners, and the governments of Canada and Newfoundland. The company sought a federal loan guarantee of \$1 billion.

On 18 July 1988, the federal government announced the details of an agreement reached with the four-company consortium to develop the Hibernia field. The deal involved a combination of a \$1.04 billion federal capital grant, a \$1.66 billion federal loan guarantee, \$300

million in federal interest assistance, \$175 million in temporary financing, \$95 million from the Canada-Newfoundland Offshore Fund and \$11 million from the Newfoundland government along with tax exemptions and tax reductions. The project was estimated to cost \$5.2 billion with an additional \$3.3 billion required for production-related spending. The target date of 31 March 1989 for finalizing the details of the agreement was repeatedly postponed and only was achieved 14 September 1990. Production of 125,000 barrels a day slated to start in 1992, destined for the U.S., is now forecast to begin in July 1997 and last for 18 years.

In October 1988, Premier Peckford appointed a five-member committee of senior civil servants to ensure that all aspects of the project were properly monitored, including the financial and industrial benefits packages. The committee had its work cut out for it in light of the shift away from strict Canadian content "controls" to "targets." The emphasis was on ensuring a Newfoundland location for a certain percentage of the work, rather than on the nationality of the company which obtained the contract. The 1988 Agreement called for about three million person-hours of work to be created in the province during the construction period.

The federal and Newfoundland governments negotiated with the consortium to ensure that two of the five newly-designed rig modules were built in Newfoundland. Newfoundland would like to promote itself as an offshore-rig building centre. The province ended by agreeing that one rig module, instead of two, and some ancillary work would be completed in the province. Much of the work on the four other modules, worth up to \$200 to \$300 million, was supposed to be set aside for Canadian companies. Newfoundland expected to receive 10,000 person-years of work over the six-year construction period. Federal Minister of Fisheries John Crosbie announced in September 1991 that \$3 million in training funds would go to prepare Newfoundlanders for jobs on the Hibernia project.

Before federal legislation authorizing \$2.7 billion in grants and loan guarantees was passed on 6 November 1990, interim financing of \$95 million from the Canada-Newfoundland Offshore Development Fund was obtained to meet the September 1990 target for issuing construction tenders.

In November 1991, the federal government negotiated an agreement with the consortium that provided for 25% of its loan guarantee to be picked up by private lenders if certain economic criteria were met once production began.

Subsequent to project go-ahead, one of the four members of the consortium, Gulf Canada Resources Ltd., put up for sale half of its 25% interest in the project. Then, in February 1992, it withdrew from the project altogether. The consortium was then made up of Mobil Oil (28%), Petro-Canada (25%), and Chevron Canada (22%). Mobil was contributing \$1.1 billion, Petro-Canada \$1 billion, Chevron \$879 million, and the federal government's contribution was \$1 billion. Gulf's promised \$1 billion had, of course, been withdrawn. So far, the consortium had spent \$450 million.

Newfoundland and Canada had agreed to indemnify the partners for 75% of their costs for proceeding with the project beyond 15 May 1992 if a replacement for Gulf could not be found and the project had to be shelved. On 15 January 1993, the federal government announced that a new agreement had been reached. Murphy Oil of El Dorado, Arkansas would take 6.5%, Mobil Oil and Chevron would increase their interest by 5%, and the Government of Canada would acquire an 8.5% interest. This last would be held by a newly formed subsidiary of the Canada Development Investment Corporation (Canada Hibernia Holding Corporation). The government was also offering the three partners interest-free loans of up to a total of \$132 million. The project was now said to be viable at then current oil prices of between \$20 and \$30 a barrel.

In April 1994, Petro-Canada announced a cost overrun of \$1 billion and a delay of six months in the construction schedule as a result of the engineering design complexities of the project. NODECO was replaced by Norwegian Contractors, a consortium that had been overseeing NODECO since the fall of 1993.

In July 1994, the possibility of faulty steel in the concrete gravity base structure suggested possible further construction delays.

In October, the management company moved the electrical part of the offshore contract from Marystown, Newfoundland to the Saint John Shipyard in New Brunswick; this resulted in 300-400 job losses for Marystown. This decision was disputed by M.I.L. Davie Inc., a

competitor, as being in violation of the Hibernia Benefits Plan. The government of Canada announced in December that no legal remedy was available in the case of such a violation. It requested a review of implementation of this benefits plan.

By April 1995, \$3.6 billion had been spent on the project, of which \$2.5 billion was in Canada. About \$1.43 billion of the amount spent in Canada was spent in Newfoundland.

Hibernia's major contractor responsible for the engineering and construction of the gravity base drilling platform is NODECO (Newfoundland Offshore Development Constructors). Shipyards in Korea and Italy were awarded contracts to build four of the five supermodules - used to house crew and drilling equipment - that sit atop the drilling platform. The fifth was built in Newfoundland by a Canadian-Norwegian consortium. (This \$350-million contract is worth more than the other four put together.) Pouring of the concrete for the base of the drilling platform began in April 1993. Design changes and slow construction delayed until November 1994 the schedule for towing the concrete and steel base to a deep-water site. The gravity base is also 30% over its original cost estimate of \$1.2 billion. All the modules are in place on the assembly pier but will not be mated to the rig's concrete base, still under construction, until early 1997. In the summer of that year, the completed structure will be towed 315 km to its final offshore location, where it will sit 218 metres high on the ocean floor in 80 metres of water. Production, which will involve about 1,000 jobs, will begin in December 1997.

By March 1996, the gravity-based structure was over half built and had demonstrated its flotation capability when it was towed in Bull Arm into deeper water; the structure is expected to be completed by November 1996. The structure, whose walls below the ocean surface are 15 metres thick, is built to withstand icebergs of up to six million tonnes. It is a reinforced version of the 14 oil platforms found in the North Sea whose legs rest on the ocean floor; the remaining 86 platforms float from tethers, the more usual method in offshore drilling.

Hibernia has become even more important to the Newfoundland economy since the collapse of the northern cod fishery in 1992. Even so, neither the federal nor the Newfoundland government will receive tax revenue from the project until the partners recover full pre-production costs. For every dollar collected by the province, 70 cents will go to Ottawa.

4. Other Development on the Grand Banks

In December 1995, Petro-Canada announced it would develop its Terra Nova field, which is estimated to contain 300 to 400 million barrels of oil. Production will average some 100,000 barrels per day over a period of 15 to 20 years, starting in 2001. Terra Nova is the second largest oil reservoir on the Grand Banks after the 600-million-barrel Hibernia field and is owned by five companies: Petro Canada (49.2%); Mobil Oil Canada Properties (20.7%); Husky Oil Operations Ltd. (15.8%); Murphy Oil Co. Ltd. (10.7%); and Mosbacher Operating Ltd. (3.6%).

Exploration is also taking off on the Grand Banks close to the Hibernia and Terra Nova fields, with Amoco Canada set to spend \$90.2 million on exploration over five years, beginning in 1996 or 1997.

Another exploration permit on the Grand Banks, valued at \$5.5 million, has been granted to Husky Oil and Murphy Oil for exploration in the area north of Hebron field.

All this offshore activity is leading Mobil and Chevron to devise plans for a transshipment terminal with a storage capacity of up to 3.5 million barrels of crude oil. If approved, the \$100 million terminal would open in 1998 at Whiffin Head, 100 kilometres east of St. John's. The plan calls for two \$150-million shuttle tankers to unload oil at the terminal from Hibernia and other fields, for transfer by conventional tanker to U.S. and European destinations.

CHRONOLOGY

7 June 1966 - The first well was drilled in Canada's eastcoast offshore, on the Grand Banks.

Nov. 1978 -June 1979 - Drilling at the Venture D-23 well off Sable Island resulted in a major gas discovery. The Venture field was estimated to contain 72 billion cubic metres (2.5 trillion cubic feet) of gas.

- May-November 1979 - A major oil discovery was made at the Hibernia P-15 well on the Grand Banks. Subsequent drilling revealed an oil field containing an estimated 115 million cubic metres (720 million barrels) of oil.
- 12 February 1982 - The government of Newfoundland submitted the question of ownership of offshore resources to the Supreme Court of Newfoundland.
- 15 February 1982 - The drill rig Ocean Ranger, working in the Hibernia field, sank with a loss of all 84 crewmen.
- 2 March 1982 - The "Canada-Nova Scotia Agreement on Offshore Oil and Gas Resource Management and Revenue Sharing" was signed.
- March 1982 - The *Canada Oil and Gas Act* was proclaimed, establishing the Canadian Oil and Gas Lands Administration (COGLA) to administer development on Canada Lands. The eastcoast offshore was included in the definition of Canada Lands, angering Newfoundland, which also claims ownership of offshore resources.
- 20 May 1982 - The federal government referred the question of ownership of resources in the Hibernia area to the Supreme Court of Canada.
- 29 June 1982 - The *Petroleum Incentives Program Act* received Royal Assent. This program offers exploration incentives to companies who meet certain Canadian ownership requirements and who explore on Canada Lands.
- 17 February 1983 - The Supreme Court of Newfoundland handed down its ruling, stating that the ownership of offshore resources rests with the federal government.
- 8 July 1983 - COGLA issued a number of leases to Petro-Canada, Mobil and Paddon Hughes for drilling offshore Newfoundland, further angering the provincial government, which would have preferred that COGLA await the Supreme Court ruling on jurisdiction over the area.
- 8 March 1984 - The Supreme Court of Canada ruled that the federal government has jurisdiction over the mineral and other natural resources of the Hibernia field off the coast of Newfoundland.

- 30 June 1984 - Legislation authorizing the Canada - Nova Scotia Agreement on Offshore Oil and Gas Resource Management received Royal Assent.
- 12 December 1984 - Canada and Newfoundland agreed to a 62-clause draft pact on Offshore Oil and Gas Resource Management.
- 11 February 1985 - Canada and Newfoundland signed the Atlantic Accord, a long-term agreement on the joint management of offshore oil and gas development.
- 15 May 1985 - Mobil Oil Canada Ltd. submitted its EIS to the federal and provincial governments.
- 30 October 1985 - A new offshore tax credit regime of \$150-250 million a year was announced.
- 15 January 1986 - FEARO Panel released its report on Hibernia development.
- 17 June 1986 - The Canada-Newfoundland Atlantic Accord Implementation (Newfoundland) Act received Royal Assent.
- 24 June 1986 - Canada-Newfoundland Offshore Petroleum Board announced approval of Hibernia Development and Benefits Plans.
- 26 August 1986 - Canada and Nova Scotia signed an Accord on joint management of oil and gas offshore exploration, development and production.
- 1 October 1986 - Government of Canada eliminated Petroleum and Gas Revenue Tax.
- 25 March 1987 - The Canada-Newfoundland Atlantic Accord Implementation Act received Royal Assent.
- 29 May 1987 - The Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act received Royal Assent.
- 18 April 1988 - Government of Canada announced drilling embargo in Georges Bank until the year 2000.
- 18 July 1988 - Government of Canada announced an agreement to develop the Hibernia oil field.

- 21 July 1988 - C-75, the Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act, received Royal Assent.
- 28 June 1990 - Third reading of Bill C-44, legislation to provide \$2.7 billion in loan guarantees and subsidies for Hibernia was delayed.
- 14 September 1990 - Hibernia development agreement announced, to be signed when C-44 passed.
- 6 November 1990 - C-44 received Royal Assent.
- December 1990 - Hibernia Consortium announced a compensation plan for fishermen to protect their income over a five-year period.
- 22 November 1991 - Governments, project participants, and the Canadian Imperial Bank of Commerce signed an agreement to replace the government debt guarantee by private funding once production commences, if economically feasible.
- February 1992 - Gulf Canada Resources Inc. withdrew from the Hibernia project.
- 2 May 1992 - House of Commons approved a motion instructing the government to table the over 50 agreements between the government and companies in the Hibernia consortium.
- 23 June 1992 - C-58, the Oil and Gas Production and Conservation Act, received Royal Assent.
- 15 January 1993 - Government of Canada announced an agreement to proceed with Hibernia under a new partnership arrangement.

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